

**STATE OF SOUTH CAROLINA
BEFORE THE PUBLIC SERVICE COMMISSION
DOCKET NO. 2021-88-E**

IN RE:

Dominion Energy South Carolina, Inc.'s)
2021 Avoided Cost Proceeding Pursuant to)
S.C. Code Ann. Section 58-41-20(A))
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**CAROLINAS CLEAN ENERGY
BUSINESS ASSOCIATION'S SECOND
SET OF INTERROGATORIES AND
REQUESTS FOR PRODUCTION TO
DOMINION ENERGY SOUTH
CAROLINA, INCORPORATED**

Pursuant to S.C. Code Ann. Regs. 103-833, the Carolinas Clean Energy Business Association ("CCEBA"), by and through its undersigned counsel, hereby submits this Second Set of Interrogatories and Requests for Production to Dominion Energy South Carolina, Incorporated ("DESC" or "Company"). Pursuant to South Carolina Rule of Civil Procedure 26, and Commission regulations, each request is continuing until the time of the hearing such that the Company must promptly transmit to CCEBA, the requested information as it becomes available.

INSTRUCTIONS

1. Responses to this discovery request should be provided to the undersigned, via email, within twenty (20) days of the date of service.
2. All information should be provided to the undersigned in the format requested and under oath.
3. All responses to the below Interrogatories/Request for Production should be labeled using the same numbers as used herein.
4. If the requested information is found in other places or in other exhibits, reference shall not be made to those, but instead, the information should be reproduced and placed in the responses to this request in the appropriate sequence.
5. All documents shall be provided in their native format, e.g., in Word, Excel, or PowerPoint format with all functions, data, and formulas intact.
6. Each request should be reproduced at the beginning of the response thereto.
7. If the response to any Interrogatory/Request for Production of Documents is that the information requested is not currently available, please state when the information requested will become available.
8. This discovery request shall be deemed continuing so as to require DESC to supplement or amend its responses as any additional information becomes available up to and through the date of hearing.

9. For any document withheld under a claim of privilege, submit a Privilege Log and submit a sworn or certified statement from your counsel or one of your employees in which you identify the document by author, addressee, date, number of pages, and subject matter; specify the nature and basis of the claimed privilege and the paragraph of this demand for documents to which the document is responsive; and identify each person to whom the document or its contents, or any part thereof, has been disclosed.

10. If a refusal to respond to a Interrogatory/Request for Production of Documents is based on the grounds that same would be unduly burdensome, identify the number and nature of documents needed to be searched, the location of the documents, and the number of hours and costs required to conduct the search.

11. Answer each Interrogatory/Request for Production on the basis of the entire knowledge of DESC, including information in the possession of DESC or its consultants, representatives, agents, experts, operating divisions, business divisions, assigns, partners, and attorneys, if any.

12. If any discovery request cannot be answered in full, respond to the extent possible and specify the reasons for DESC's inability to respond.

DEFINITIONS

As used herein, the following terms shall have the meaning and be interpreted as set forth below:

1. "You," "your," and "Company" mean DESC or any of its affiliates, officers, directors, employees, attorneys, or agents.

2. "Application" is defined as the application filed by Dominion Energy South Carolina, Inc. on April 22, 2021 or as otherwise revised.

3. "Company" and "DESC" are defined as Dominion Energy South Carolina, Incorporated, its parent(s), subsidiaries, affiliates, predecessors, successors, officers, directors, agents, employees, and other persons acting in its behalf.

4. "Workpapers" and "documents" are defined in the broadest terms and should not be construed as limited to the listed examples, or limited only to items that are currently within your control or custody; include each and every original or copy of words or information generated by printing, typing, longhand, electronic recording, or other process, regardless of the form thereof,

and include any kind of writing. Such documents include, but are not limited to, published materials, reports, correspondence, emails, records, memoranda, notices, notes, marginal notations, messages, teletype printouts, statements, books, studies, minutes, diagrams, drawings, maps, surveys, plans, charts, graphs, data, computer files, billings, evaluations, photographs, audio tapes, and videotapes. The terms include drafts, revisions or amendments of any of the above, and generally, any kind of tangible, permanent records that are now, or formerly were, in your possession, custody or control, or that were known by you to exist, and that can be located or discovered by reasonably diligent efforts.

5. "Communication(s)" when used in these Requests shall include the transmittal of information by any means, written, oral, electronic or otherwise.

6. When used in referenced to a document, "identify," identity," and "identification" mean to state the type of document (e.g., computer-stored information, microfilm, letter, memorandum, policy circular, minute book, telegram, chart, etc.), or some other means of identifying it, and its present location and custodian. If any such document was, but no longer is, in your possession or subject to your control, state what disposition was made of the document, and if the document was destroyed or disposed of pursuant to a retention policy, please state the retention policy.

INTERROGATORIES

2-1. Please refer to Direct Testimony of Peter B. David, Page 9, which states:

The marginal Operating Reserve requirement for each solar generator is then calculated as the delta between output minus scheduled using the NREL dataset as a proxy. Following this, the Operating Reserve requirement is summed across solar generators for each 5-minute interval in the forecast.

Please confirm that Guidehouse determined DESC's overall incremental operating reserve requirement by (1) first calculating the incremental reserve requirement for each 5-minute interval at each individual solar site, and then (2) summing the values for all solar sites. If not confirmed, please provide a more detailed description of the methodology.

RESPONSE:

- 2-2. Please refer to Direct Testimony of Peter B. David, Page 9, which states: “Ideally, the Study would rely on the difference between 1-hour ahead advance schedules and actual operations to estimate the marginal need for Operating Reserves created by solar resources; however, that data is unavailable.”
- a. Identify any publicly available data sets known to DESC that provide a simulated 1-hour ahead forecast (similar to the 4-hour ahead NREL data used in Guidehouse’s analysis) that could be used for modeling purposes.
 - b. Does DESC currently incorporate a solar forecast in its system operations? If so, what is the timescale of this forecast (e.g. 1-hour ahead, 4-hour ahead, etc.)?
 - c. Identify any commercially available solar forecasting services known to DESC that could provide a forecast on a timescale less than four hours.

RESPONSE:

- 2-3. Please refer to Direct Testimony of Peter B. David, Page 10, which states: “Because of practical limitations associated with the size of the dataset, the model uses Monte Carlo draws to pick random days and records violations that last for more than 15 consecutive minutes.” Please clarify to which dataset the Monte Carlo draws are applied and explain whether the violations recorded through the Monte Carlo process are at the solar plant level, or at the DESC system level.

RESPONSE:

- 2-4. Please refer to Direct Testimony of Peter B. David, Page 11, which states: “The Study relies on a 100-draw Monte Carlo simulation that is repeated 10 times and the final requirement by month is weighted by the number of draws for each month.”
- a. Please provide the weighted and unweighted values for each month.
 - b. Please explain the significance of using 100 draws versus a different number.

- c. Please explain the significance of repeating this exercise 10 times. Is each repetition meant to represent a different year in the 10-year forecast?

RESPONSE:

- 2-5. Please refer to Exh. PBD-2, Page 14 which states: “Plant and unit level operational parameters were provided by DESC to Guidehouse.” Please provide the following unit-specific operational parameters provided by DESC to Guidehouse and describe any difference between these parameters and the model inputs used by DESC for calculating Avoided Energy Costs:
- i. 8760 Solar Resource Shape (MW)
 - ii. Minimum Load (%)
 - iii. Full Load Heat Rate (MMBtu/MWh)
 - iv. Non-Fuel VOM (\$/MWh)
 - v. Must Run Status
 - vi. Minimum Uptime (Hours)
 - vii. Minimum Downtime (Hours)
 - viii. Expected Forced Outage Rate (EFOR) (%)
 - ix. Annual Maintenance (Hours)
 - x. Startup Fuel Type and Requirements (MMBtu)

RESPONSE:

- 2-6. Please refer to Exh. PBD-2, Page 21 which states: “Guidehouse underwent a diligent process to benchmark the DESC system to recent actual operations.” Please identify any adjustments made to the model inputs based on this benchmarking process.

RESPONSE:

- 2-7. Please refer to Exh. PBD-2, Page 6 which states: “As DESC integrates larger amounts of solar and can obtain actual historical data for solar in upcoming years, this analysis can be updated with actual site-specific solar operations rather than data provided by NREL.” Identify any site-specific solar operations data provided by DESC to Guidehouse. If none was provided, please explain why.

RESPONSE:

- 2-8. Please refer to Exh. PBD-2, Page 9 which states: “Due to the need for self-sufficiency within its balancing area, DESC must rely on its own generators to meet reserves and cannot rely on external sources.”
- a. Please reconcile this statement with the fact that DESC participates in the VACAR reserve sharing group, which allows DESC to rely on other utilities to maintain sufficient reserves “without having to hold all of the reserve requirement” itself.
 - b. What is the fractional share of total VACAR reserves DESC contributes?
 - c. Could DESC similarly contract with neighboring entities to share in the provision of flexibility reserves for solar?
 - d. Please describe how DESC’s requirements for holding reserves might change if DESC (i) participated in a regional market for energy imbalance services, (ii) coordinated economic dispatch of energy and ancillary services, or (iii) consolidated its balancing area with neighboring systems.

RESPONSE:

- 2-9. Please refer to Exh. PBD-2, Page 22 which states: “The ACE contributions of individual sites are scaled appropriately based on the actual capacity assumed to be at the given location.” Is the term “ACE contribution” as it is used here equivalent to the term “Operating Reserve requirement” used on page 9, lines 14-15 of Mr. David’s Direct Testimony? If not, please explain the difference.

- a. Please explain in detail how the ACE contributions for each individual site were determined and scaled, providing the scaling factor assumed for each site.
- b. Please explain how the DESC system-wide ACE was determined from the individual site contributions.

RESPONSE:

- 2-10. Please refer to Exh. PBD-2, Page 23 which states: “Guidehouse assumes the reserve requirement is the 90th percentile of instances under the worst-case scenario BAAL for each month so to not overestimate the need.” Please explain why the 90th percentile was selected and whether “90th percentile” refers to the 90th percentile of the reserve requirement for each individual site, or the 90th percentile of the reserve requirement for the DESC system.

RESPONSE:

- 2-11. Please refer to Exh. PBD-2, Page 24 which states: “Then, by averaging the scaled forecast error across all locations, the impact of any one particular solar profile skewing the total operating reserves needed was minimized.” Please provide a detailed explanation of how the average of the scaled forecast errors was calculated and how that average was used to determine the overall DESC solar forecast error.

RESPONSE:

- 2-12. Please refer to Exh. PBD-2, Pages 24-25 which states:

The following methodology is used to calculate the solar forecast error.

1. Calculate the 4-hour ahead solar forecast as the average of all active solar sites located around the DESC service territory.
2. Calculate the 5-minute generation as the average of the actual generation at the same sites.
3. Calculate the 5-minute variance in solar generation as the difference between the forecast and the actual in every 5-minute period.
4. Calculate the solar variance DESC must respond to as the 15-minute moving average of the 5-minute forecast error.

The result of this analysis is a comprehensive set of data that gives the amount that actual solar generation varied from the 4-hour forecast.

Please provide a detailed explanation of how the solar forecast error calculated for each 5-minute time step was in turn used to determine the incremental reserve requirements shown in Tables 9 and 11.

RESPONSE:

- 2-13. Please refer to Exh. PBD-2, Page 25 which states: “Since PROMOD does not allow for hourly changes in operating reserves...” Please state whether or not for each of Guidehouse’s PROMOD runs the incremental reserve requirements were maintained during all hours of the corresponding month and that the same incremental reserve requirement is also applied for all solar producing hours, rather than varying the level of reserves based on expected solar production.

RESPONSE:

- 2-14. For each timestep of the PROMOD runs conducted for the VIC analysis, please provide:
- a. The MW of Total Reserves Online.
 - b. Risk of Solar Shortfall.
 - c. The MW of Reserve Shortage.
 - d. Hourly dispatch for each generation unit.
 - e. Contribution to operating reserves (i.e. ramping capability) for each generation unit
 - f. Modeled or assumed import/export limits from the DESC system.
 - g. The modeled or assumed LMP prices for imports/exports.

RESPONSE:

- 2-15. Please identify any constraints Guidehouse assumed in its analysis that would limit the ability for imports to be used to address any reserve shortages.

RESPONSE:

- 2-16. Please refer to Exh. PBD-2, Table 4, which identifies 250 MW of incremental reserves for the Baseline (340 MW Solar) scenario.
- a. Please confirm whether these 250 MW are representative of the reserves discussed on Exh. PBD-2 Page 9 (i.e. 200 MW for DESC's VACAR obligation plus 50 MW for load-following). If not, please confirm that the 250 MW in the table are incremental to those discussed on Exh. PBD-2 Page 9.
 - b. Assuming the 250 MW in the table are representative of those on Exh. PBD-2 Page 9, does DESC assume that this 250 MW exceeds the amount required to integrate 340 MW of solar? If so, was any excess amount from the 250 considered available to provide incremental reserves in the subsequent tranches?

RESPONSE:

- 2-17. Please refer to Exh. PBD-2, Page 30 which states: "Calculate the potential lost solar generation due to forecast uncertainty." Please explain in detail how this calculation was performed.

RESPONSE:

- 2-18. Referring to Exh. PBD-2, Page 31 Figure 13, please state the day and month when each referenced shortfall occurred, as well as the MW magnitude.

RESPONSE:

- 2-19. Please refer to Exh. PBD-2, Page 31, which states:

To ensure that the analysis does not overestimate the costs to integrate reserves at any of the penetration levels, PROMOD was run with each of these levels of reserves and the results were formulated based specifically on the increased amount of solar generation hourly as compared to the previous tranche thereby reducing bias by eliminating from the calculations any hours in which solar is not generating and more heavily weighting hours where solar generation is high as compared to hours where solar generation is low.

Please explain in detail how the weighting was applied based on the relative level of solar output.

RESPONSE:

- 2-20. Please refer to Solar Site Variability Metric Mitigation Protocol (Amended Application Exhibit 9).
- a. Please explain how the Company defines “applicable daylight hours” for measuring the change in energy production and how “applicable daylight hours” will change throughout a calendar year. How will the Company apply this definition to the SSVM calculation methodology?
 - b. If the production during the later hour in the SSVM calculation is 0 or less (ex: at sunset or during the daytime) will the Company include that time period in its SSVM calculation?

RESPONSE:

REQUESTS FOR PRODUCTION

- 2-1. Please produce any workpapers demonstrating the calculations referenced in Interrogatory 2-1 (a) with formulas intact. Please note that the workpapers provided to date do not include these calculations.

RESPONSE:

- 2-2. In reference to Interrogatory 2-3, please produce the dataset referenced in the cited testimony. Please note that the workpapers provided to date do not include these data.

RESPONSE:

- 2-3. Please produce all data draws and workpapers used in the Monte Carlo simulation discussed in Interrogatory 2-4. Please note that the workpapers provided to date do not include these calculations.

RESPONSE:

- 2-4. Referring to the statement quoted in Interrogatory 2-9, please produce all workpapers and data used in determining and scaling ACE contributions for each individual site as well as determination of system-wide ACE.

RESPONSE:

- 2-5. Referring to the 90th percentile values discussed in Interrogatory 2-10, please produce any workpapers used to calculate those 90th percentile values (i.e. the reserve requirement) with all formula intact. Please note that the workpapers provided to date do not include these calculations.

RESPONSE:

- 2-6. Referring to the scaled forecast error discussed in the quoted language in Interrogatory 2-11, please produce all data and workpapers used to calculate the average of the scaled forecast errors and the

overall DESC solar forecast error (with formula intact). Please note that the workpapers provided to date do not include these calculations.

RESPONSE:

- 2-7. In reference to Exhibit PBD-2, Pages 24-25, as quoted in Interrogatory 2-12, please produce the referenced “comprehensive set of data” and all workpapers used to perform the calculations referenced in the quoted language, with all formula intact. Please note that the workpapers provided to date do not include these calculations.

RESPONSE:

- 2-8. In reference to Interrogatory 2-12, please produce all workpapers used to perform the calculation of the incremental reserve requirements shown in Tables 9 and 11. Please note that the workpapers provided to date do not include these calculations.

RESPONSE:

- 2-9. In reference to Interrogatory 2-17, please produce all workpapers used to determine potential lost solar generation due to forecast uncertainty, with all formula in-tact. Please note that the workpapers provided to date do not include these calculations.

RESPONSE:

- 2-10. In reference to Interrogatory 2-18, please produce all underlying data used to generate the referenced chart and all workpapers used to perform this analysis with all formula in-tact. Please note that the workpapers provided to date do not include these calculations.

RESPONSE:

- 2-11. In reference to Interrogatory 2-19, please produce all workpapers used to perform these weighting calculations with all formula in-tact. Please note that the workpapers provided to date do not include these weighting calculations.

RESPONSE:

Respectfully Submitted,

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*As Counsel for Intervenor, Carolinas Clean Energy
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